

Use Of Dynamic Distortion To Predict And Alleviate Loss Of Control, Phase I

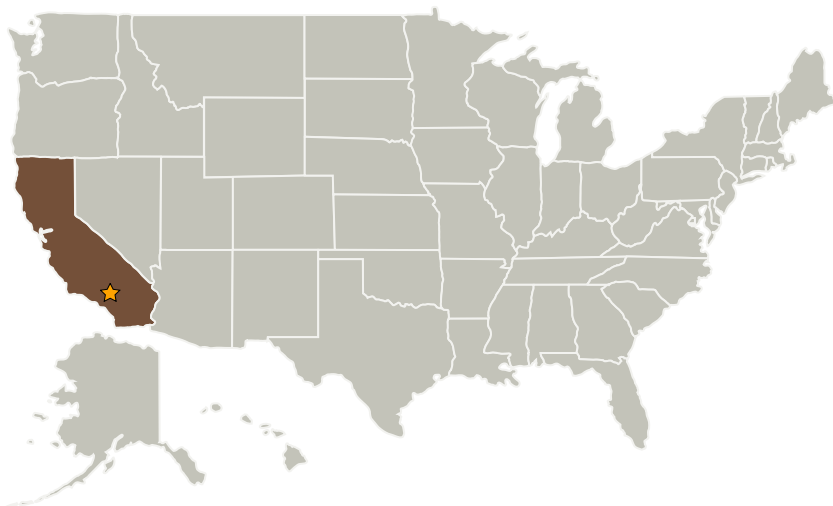
Completed Technology Project (2004 - 2004)



Project Introduction

Improvements to aviation safety will be made by the development and validation of means to alleviate, alert, and inhibit loss of control associated with unfavorable pilot-vehicle interactions. These unfavorable interactions are caused in part by deficiencies, called "dynamic distortion," in the manual flight control system. Many sources of dynamic distortion such as friction, preload, and backlash have been reduced or eliminated in modern aircraft by improved hydraulic systems and by the replacement of mechanical linkages with fly-by-wire systems. Other sources of dynamic distortion remain, such as rate and position limits, power reductions, jammed effectors and mis-rigging. In older systems with mechanical linkages the pilot was at least aware that distortion was occurring, whereas in many modern, powered systems these cues are missing. An innovative concept is proposed whereby the pilot is provided with manipulator tactile cues when dynamic distortion occurs. These cues are hypothesized to improve aircraft safety by reducing the likelihood of unfavorable pilot-vehicle interactions. This improvement will be demonstrated in Phase I, first by modeling and simulation and then by conducting a PC-based manned simulator experiment. In Phase II the concept will be further developed and then validated with a flight test experiment.

Primary U.S. Work Locations and Key Partners



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Table of Contents

Project Introduction	1
Primary U.S. Work Locations and Key Partners	1
Organizational Responsibility	1
Project Management	2
Technology Areas	2

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Armstrong Flight Research Center (AFRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Armstrong Flight Research Center(AFRC)	Lead Organization	NASA Center	Edwards, California
Systems Technology, Inc	Supporting Organization	Industry	

Primary U.S. Work Locations

California

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

David Klyde

Technology Areas

Primary:

- TX03 Aerospace Power and Energy Storage
 - └ TX03.1 Power Generation and Energy Conversion
 - └ TX03.1.6 Other Advanced Concepts for Generating/Converting Power